

## WHAT IS CLAIMED IS:

Claims

1. A bone prosthesis for implantation at a joint, the prosthesis comprising a stem sized and shaped for implantation in a bone at the joint such that at least a portion of the stem is received in the bone and a portion is exposed to locations outside the bone, the stem having a passageway arranged to vent fluid pressure from a first location which is subject to elevated fluid pressures when the joint is in use after implantation of the prosthesis to a second location for venting fluid from the first location to the second location thereby to inhibit fluid pressure build up between bone located at the joint and the prosthesis.

2. A bone prosthesis as set forth in claim 1 wherein the passageway is arranged to vent joint wear debris from the first location which is subject to high concentrations of joint wear debris after implantation of the prosthesis to the second location for venting joint wear debris from the first location to the second location thereby to inhibit wear debris build up between bone located at the joint and the prosthesis.

3. A bone prosthesis as set forth in claim 1 wherein the stem includes a tip adapted to be received through the bone upon implantation of the prosthesis, the tip being disposed generally at the second location and the passageway having an aperture generally at the tip.

4. A bone prosthesis as set forth in claim 3 wherein the passageway extends within the stem.

5. A bone prosthesis as set forth in claim 4 wherein the passageway includes a primary channel extending

generally longitudinally of the stem and secondary channels extending from multiple, spaced apart openings on the exterior of the stem to the primary channel.

6. A bone prosthesis as set forth in claim 5 wherein the stem has side surfaces, the secondary channel openings being located in the side surfaces so that the secondary channels and the primary channel are in fluid communication with a prosthesis-bone interface, the secondary channels extending inwardly from the openings at angles oblique to the side surfaces.

7. A bone prosthesis as set forth in claim 6 wherein the stem is sized for transosseous implantation in which the stem extends through the bone and the tip of the stem is exposed outside of the bone.

8. A bone prosthesis as set forth in claim 7 wherein the primary channel opens at the aperture in the tip of the stem, the aperture and primary channel being sized and shaped to receive an infusion element for infusing fluid into the channel when the bone prosthesis is installed in the bone, the fluid passing from the primary channel to the secondary channels and the prosthesis-bone interface.

9. A bone prosthesis as set forth in claim 4 for implantation in a femur at a hip joint, the prosthesis further comprising a collar on an end of the stem opposite the tip, a neck mounted on the collar and a ball mounted on the neck, the passageway in the stem opening at the first location disposed on an upper surface of the collar.

10. A bone prosthesis as set forth in claim 9 wherein the passageway constitutes a first passageway, and wherein the stem has a second passageway in the stem opening on an

5 upper surface of the collar and extending to the second location.

11. A bone prosthesis as set forth in claim 10 wherein the second passageway is sized and shaped to receive an instrument therethrough to provide access to the first location.

12. A bone prosthesis as set forth in claim 11 wherein the second passageway has no connection to the first passageway.

13. The bone prosthesis of claim 12 wherein the first and second passageways extend through the stem to separate apertures at the stem tip.

14. A bone prosthesis for implantation at a joint, the prosthesis comprising a stem having:

a tip generally at one end thereof, and

a collar on an end of the stem opposite the tip,

5 the stem being sized and shaped for reception in a bone at the joint such that the tip of the stem is exposed to locations outside of the bone,

10 the stem having a passageway therein extending from a first location on the bone prosthesis to a second location on the bone prosthesis.

15. A bone prosthesis as set forth in claim 14 in combination with an infusion element, wherein the passageway of the bone prosthesis has an aperture at the second location, the aperture and passageway being sized and shaped to receive an infusion element for infusing fluid into the passageway when the bone prosthesis is installed in the bone.

16. A bone prosthesis as set forth in claim 15 wherein the passageway comprises a primary channel extending from the aperture at the second location and secondary channels extending from the primary channel to openings in the bone prosthesis, the infused fluid being capable of passing from the primary channel to the secondary channels and thence out of the secondary channel openings.

17. A bone prosthesis as set forth in claim 16 wherein the infusion element has threads formed thereon, and wherein the primary channel has threads at the aperture adapted to engage the threads of the infusion element for securing the infusion element in the aperture.

18. A bone prosthesis as set forth in claim 17 wherein the tip of the stem is generally at the second location and the primary channel aperture is located generally at the tip.

19. A bone prosthesis as set forth in claim 15 further in combination with an infusion port in fluid communication with the infusion element, the infusion port being adapted for implantation under the skin for use in repeated infusion of fluid into the passageway.

20. A method of implanting a femoral head-neck prosthesis in a femur without the use of cement, the femur having a shaft and a neck at the upper end of the shaft at the medial side of the femur, the prosthesis having a longitudinal passageway for venting fluid pressure from a first location which is subject to elevated fluid pressures when the joint is in use after implantation of the prosthesis to a second location for venting fluid from the first location to the second location thereby to inhibit fluid pressure build up between bone located at the joint and the prosthesis, the method comprising the steps of:

cutting the neck of the femur to form a seat on the  
femur neck;

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drilling a passage along a line through the shaft of  
the femur; and

inserting the stem of the prosthesis in the passage of  
the femur such that the longitudinal passageway for venting  
fluid is not occluded.

21. A method as set forth in claim 20 wherein the step  
of inserting the stem comprises driving the stem through the  
passage until a distal end of the stem protrudes from the  
lateral side of the femur.

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22. A method as set forth in claim 21 further  
comprising, prior to said step of inserting the stem, the  
step of attaching a removable guide on the distal end of the  
stem to inhibit occlusion of the longitudinal passageway of  
the stem during said step of inserting the stem.